



Surry  
Virginia



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**RPPA 3.0 - 1**

REP Post-Plume Awareness Course (RPPA)  
Plume (Emergency/Early) Phase – Responsibilities/Actions

# Module Objectives

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- Given a current REP Program Manual (RPM), Participant Manual (PM), Post-Plume Reference Booklet, and Handouts the student will be able to:
- *Describe* the roles and responsibilities of the Federal & State agencies, 50-mile ingestion exposure pathway counties, and Offsite Response Organizations (OROs) involved in the adequate protection of the health and safety of the public during the Plume (Emergency/Early) phase of a radiological incident at a NRC-licensed commercial NPP.



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# Radiological Incident Phases

Potential Exposure Pathway	Phases			Protective Actions	
		Site Area Emergency (SAE)		Precautionary protective actions	Incident at NPP
External radiation from plume	Plume / Early (Emergency)	General Emergency (GE)	RESPONSE	<ul style="list-style-type: none"> <li>Sheltering</li> <li>Evacuation</li> <li>Control of access</li> </ul>	Start of Release
Inhalation of radioactivity in the plume				<ul style="list-style-type: none"> <li>Sheltering</li> <li>Stable Iodine</li> <li>Evacuation</li> <li>Control of access</li> </ul>	Release Under Control and environmental measurements available
Contamination of skin and clothes				<ul style="list-style-type: none"> <li>Sheltering</li> <li>Evacuation</li> <li>Decontamination of persons &amp; service animals</li> </ul>	
External radiation from ground deposition		Post-Plume / Intermediate	RECOVERY	<ul style="list-style-type: none"> <li>Evacuation</li> <li>Relocation</li> <li>Decontamination of land and property</li> </ul>	
Inhalation of resuspended radioactivity				<ul style="list-style-type: none"> <li>Relocation</li> <li>Decontamination of land and property</li> </ul>	No Additional Protective Actions Needed
Ingestion of contaminated food and water				<ul style="list-style-type: none"> <li>Food and water controls</li> </ul>	
		Long-Term Recovery			



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Plume (Emergency/Early) Phase – Responsibilities/Actions



# Emergency Classification Levels

Notification of Unusual Event

Alert

Site Area Emergency

General Emergency



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# Notification of Unusual Event (NOUE)

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- **Potential** degradation of the level of safety of the plant OR indication of a security threat to facility protection has been initiated.
- **No releases** of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.
- **Poses no threat to public safety**



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Plume (Emergency/Early) Phase – Responsibilities/Actions



# Alert

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- **Actual** or **potential** substantial degradation of the level of safety of the plant OR a security event that involves probable life-threatening risk to site personnel or damage to site equipment because of a hostile action.
- **Any releases expected to be limited** to small fractions of the EPA Protective Action Guide (PAG) exposure levels.
- **No threat to public**



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Plume (Emergency/Early) Phase – Responsibilities/Actions



# Site Area Emergency (SAE)

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- **Actual** or **likely** major failures of plant systems needed for protection of the public OR hostile action that results in intentional damage or malicious acts:
  - **Toward site personnel or equipment that could lead to the likely failure of, or**
  - **Prevents effective access to equipment needed for the protection of the public.**
- Any releases **not** expected to exceed EPA PAG exposure levels beyond site boundary.
- May require precautionary protective actions.



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# Precautionary Actions

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- Choice of protective actions will be based on the status of the incident site and the prognosis for worsening conditions. Precautionary measures based on worst-case scenarios may be used before implementation of protective actions based on PAGs.
- List possible precautionary actions that may be taken prior to the release of a radioactive plume from a NRC-licensed commercial nuclear power plant?



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# Possible Precautionary Actions

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- Evacuate School Children; Licensed Day Care; Nursing/Care Facilities; Hospitals; Correctional facilities; and Mobility Impaired Populations
- Livestock on stored feed and water
- Restrict hunting & fishing
- Controlling access of various transportation modes through the area (e.g., air, rail, water, and highways)
- Temporary Embargo (hold) on possible contaminated food
- Notification of Ingestion Counties
- Request Federal support for response
- Public messaging / inquiries
- Water supply restrictions
- Coordinating Field Monitoring Teams (FMTs)



❖ *See Participant Notes*

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# General Emergency (GE)

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- **Actual** or **imminent** substantial core degradation or melting with potential for loss of containment integrity OR hostile actions that result in an **actual loss of physical control** of the facility.
- **Release** can be reasonably **expected to exceed** EPA PAG exposure levels offsite for more than the immediate site area.
- **Protective action recommendations (PARs) and decisions (PADs) are necessary.**



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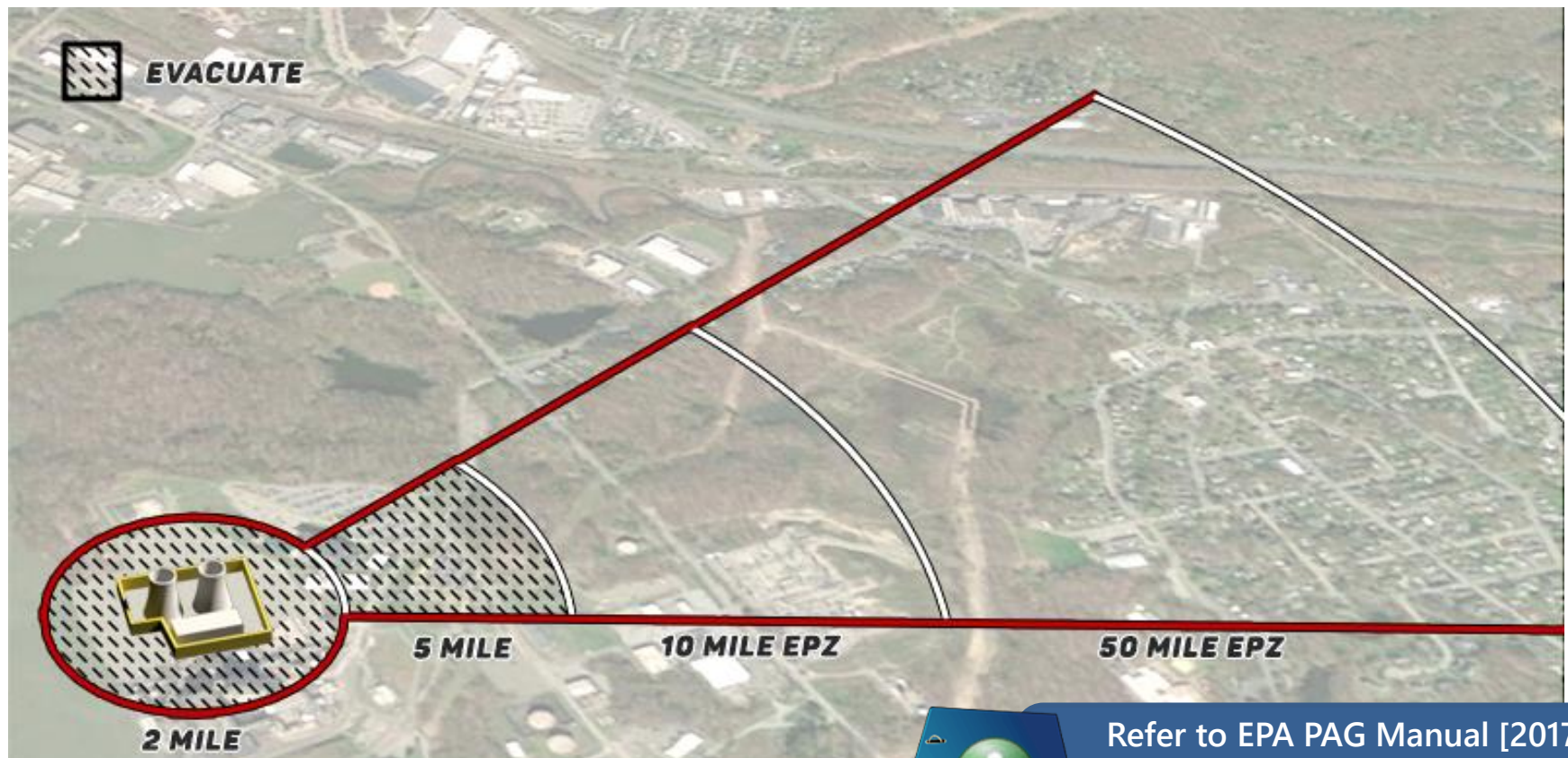
*See Participant Notes*

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# Principal Protective Actions for the Early Phase



Refer to EPA PAG Manual [2017]  
"Evacuation vs. Sheltering-in-Place" § 2.2.2 pg. 18)



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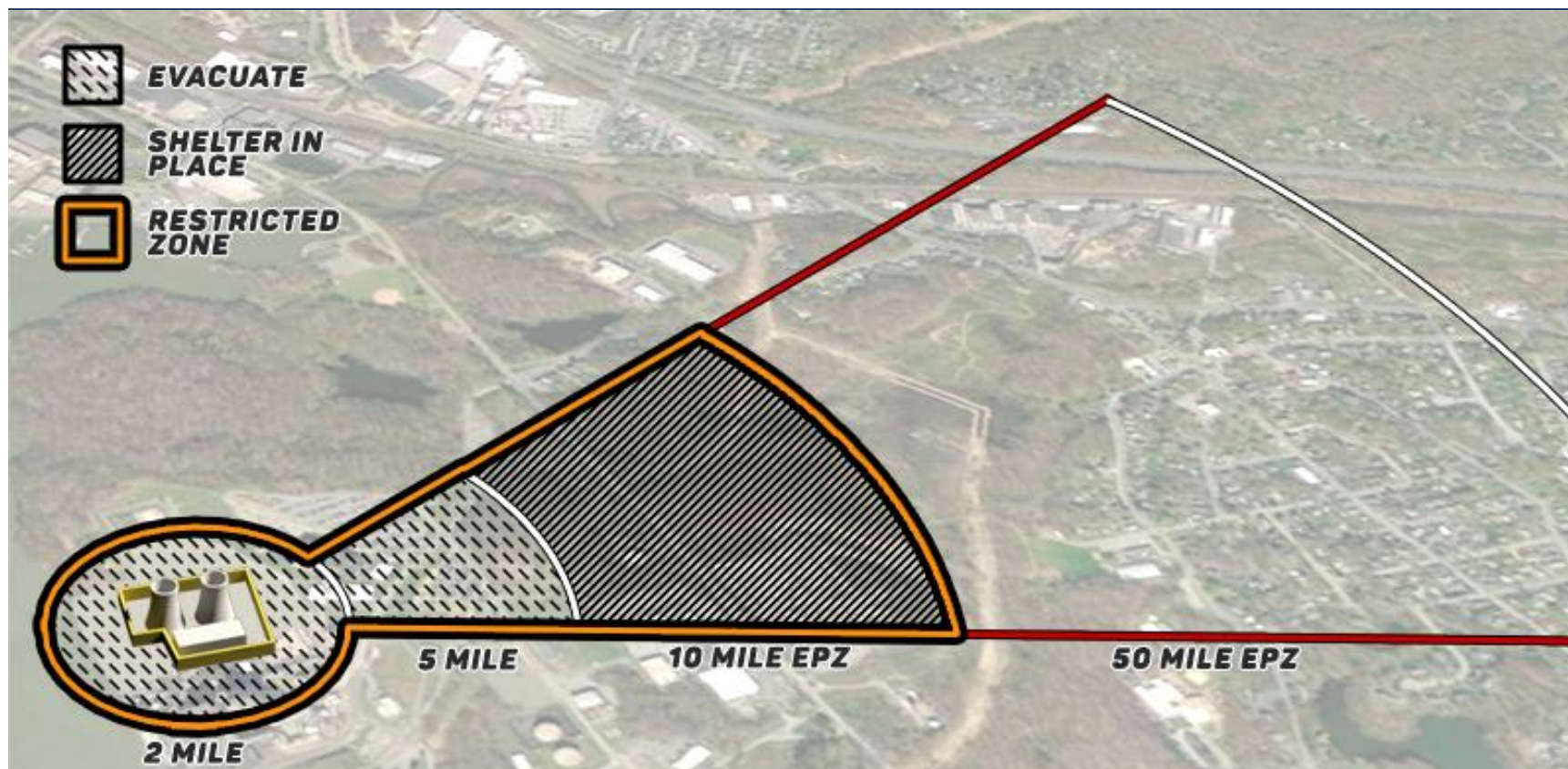
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Plume (Emergency/Early) Phase – Responsibilities/Actions



# Principal Protective Actions for the Early Phase



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# General Emergency (GE) Classification Level - Planning Considerations

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- Identify the individuals (by title) responsible for the operational coordination of these response actions –



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# Controlling Occupational Exposure and Doses to Emergency Workers

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- “To minimize the risks from exposure to ionizing radiation, employers of emergency workers (or incident commanders, who may or may not be the same) should prepare emergency response plans and protocols in advance to keep worker exposures ALARA, an acronym for "as low as reasonably achievable," which means making every reasonable effort to maintain exposures to radiation as far below the dose limits as is practical consistent with the purpose for which the activity is undertaken.”



Refer to EPA PAG Manual  
[2017] §3.1 pgs. 34-38



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Plume (Emergency/Early) Phase – Responsibilities/Actions



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Plume (Emergency/Early) Phase – Responsibilities/Actions

# Transition and Summary

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- **Module 3.0** discussed Plume (Emergency/Early) Phase Responsibilities/Actions by Emergency Classification Level, to include the precautionary protective actions that may be taken prior to an accidental plume release from a NRC-licensed commercial nuclear power plant.
- **Module 4.0** will present Post-Plume (Intermediate) Phase Responsibilities/Actions supporting Exposure Interventions.



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Plume (Emergency/Early) Phase – Responsibilities/Actions